ITEMS OF INTEREST.

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Shots from the Profession.

THE TRUE CAUSE OF THE MARKING AND GROOVING OF TEETH.

DR. L. C. INGERSOLL, KEOKUK, IOWA.

[Concluded from page 6.]

If it is possible for you to dismiss from your minds the popular theory, you will be prepared to consider another and to mark its coincidence with well-known facts. The statement of the new theory is that these markings do not occur during the follicular development, but are the result of chemical action occurring after the development of the crown and its emergence through the gum. The fact of the erosion of the enamel at the margin of the gum, in the form of a groove, is one of universal observation. It may be considered an accepted fact that a horizontal groove or line may thus be produced along the labial or buccal face of a tooth, and also, as sometimes seen, on the lingual face. This dissolving of the enamel, in a horizontal line at the margin of the gum, may occur at any period during the emergence of the crown—at the time when the point of a cuspid has just made its appearance, or when half the crown is seen; in the latter case the marking will appear on the fully developed tooth, midway between the point of the cusp and the margin of the gum. The case is not now fully explained till we account for the appearance, at regular intervals, of grooves alternating with ridges.

I saw this difficulty some years ago, in attempting to establish the theory; and discovered, as I think, full explanation in the physiological law that governs both plant and animal development, and that is the law of alternate vital action; in other words, that *active* development alternates with *arrested* development. Illustrations are both ample and evident throughout the body, and are apparent everywhere in animate nature. Look out on the maples, and you will see a case of suspended development; the leaf buds of last year have fully unfolded; the leaf has expanded to its full size; you will see no more

development at the top of the tree, possibly, for two or three weeks. It has suspended development at the ends of the branches, and is developing in some other part of the tree. After a period of arrested development at the top, you will see a renewal of development and the tree will be covered with a fresh growth of light colored, yellowish-green foliage. Look at the peach tree when the petals of its blossom fall, the fruit germ will, in two or three days have gained the size of a pea, and soon after that of a cherry, and rapidly reach the size of a robbin's egg, then suspend, and make no more increase in size for weeks. But this whole tree does not suspend; it is developing in some other part, the stone which was before pulpy, is now hardening; each part alternates with some other part.

Arrested development therefore is shown to be a physiological law, and as such to prove the fallacy of assuming that arrested development implies constitutional disease and impairment of tissue. Because, under the physiological law, when the development processes are for a while suspended, the tissues do not suffer impairment by reason of the suspension. Nature takes up the work where she left off and the tissue is perfect throughout. Every part of the human body has its alternating part—the brain alternates in its development with the cranium; the intestinal canal with the abdominal walls; the teeth with the surrounding tissue, the alveolar walls; the ameloblasts with the odontoblasts,—they are counterparts of each other. The working out of this law is one of the economics of nature. The elements of bodily growth are obtained through the nutrient system. If it was required that all parts of the body should develop uniformly and at the same time, it would be impossible for the nutrient system to supply all the elements. If all the hard tissue of the body developed equally, in the same period of time, it would be an utter impossibility, in the nature of things, to obtain in food the amount of lime salts which would be required. This fact shows the economy of nature in the law of alternate vital action. Were there never any functional disturbances caused by disease, the body would develop under this law in the same perfect symmetry as we might presume it would under a system of uniform and uninterupted development. This law of alternate development explains the incomplete formation of tissue, in cases of congenital hernia. In the alteration between the intestinal canal and the abdominal walls, the functions employed in the development of the latter may not keep pace with the intestinal development, caused by some functional weakness at the period when development should have been normally active in the abdominal tissue. We are often called to observe the want of harmony between the teeth and the jaws—the teeth are too large for the jaws, or the jaws are too large for the teeth. This occurs because, at the period when the vital forces were employed in

the development of the one or the other, either there was a deficiency in the supply of lime salts or a deficiency in the power of assimilation.

Now, we are prepared to consider the alternation of grooves and ridges on the teeth. It must have been observed by some of you, at least, that investigators, concerning different organs of the body, have found it not only convenient, but necessary, so far as their observations concerning the teeth are concerned, if they would note decided changes and progress, to make their observations bi-monthly. This circumstance points to the fact that their alternating period of development returns about once in two months. This conforms, also, to the periods laid down in our books, as usually observed concerning the emergence of the teeth; a new tooth appearing about once in two months; the centrals of the deciduous set at about the seventh month; laterals at about the ninth month; then the molars appearing successively in the 24th, 26th, 28th and 30th months. This bi-monthly development pertains not simply to the period of cutting, but also to the periods of progress, on to the full development and normal position of the teeth in the jaws.

Now, we are in possession of all the facts, individually considered, and necessary to the production of the peculiar pathological condition under consideration: *First fact*—an acrid fluid developed at the margins of the gum which, in its nascent state, is an active solvent of enamel; *Second fact*—a *periodic* active development of the teeth, during which the tooth rapidly emerges, alternating with a periodic cessation of development, during which the tooth crown does not advance. The first fact may be the result of gastritis or a general febrile condition, whether associated with exanthematous disease or not. A diagnosis need not go beyond the inflammation of the mucous tissue of the mouth. Suppose, now, this occurs at the developmental period of from five to ten years of age, and is active at the alternating period of cessation of development, a horizontal groove must inevitably be the result. This period of cessation is followed, according to a law of nature, by a period of rapid development and emergence of the tooth crown from the gum. During this period there is no portion of the enamel sufficiently long in contact with the margin of the gum, where this erosive agent is working, to seriously affect the enamel. But if the diseased condition remains for several months through a summer season, as it sometimes does, then, when the next periodic cessation of development occurs, whether it is in exactly two months or three months, that period another groove will be formed, and the number of grooves will correspond with the number of periods when there was a cessation of advance of the tooth toward the full exposure of the crown.

EXCISION OF THE ALVEOLUS.

W. GEO. BEERS, L.D.S., MONTREAL.

I sent you a short note on this subject for last February ITEMS. I respond to your request for something more in detail. In the June, 1869, number of the *Journal of Dental Science*, I alluded to the uselessness of the alveolar process, after the teeth are extracted. I suggested that in many cases this loose, spongy bone might be excised to advantage, at the same time the teeth were removed. By this simple operation, we may forstall nature in preparing mouths for artificial teeth, where there is special protrusion of this ridge. In many cases where the lips are thrown out in a most unsightly manner, the ridge will never be so absorbed as to allow gum teeth, and even with plain teeth the appearance is ugliness personified; yet by my process, the features are improved; appropriate gum teeth can be used, and the best state of that man will be better than in his palmiest days. With plain teeth in such cases, even if they are otherwise slightly, you can not prevent a depression under the nostrils, which is always a deformity, and say what you will of celluloid to build out the features here, it is a miserable substitute for porcelain gums. There is also sometimes a hideous display of gums and alveolus below the upper lip, which makes the lovliest face, assume an animal aspect, especially in a smile. Why not cut away this prominence of ridge and bring everything into harmony?

Let me give an instance: The patient was a young lady who had sucked her thumb in childhood, causing the upper incissors and cuspids to protrude half an inch beyond the outer line of the lower teeth. The alveolus was very thick and its outer plate so prominent the lips interfered with the nostrils and was quite a quarter of an inch below the normal line of the lips. It was almost impossible for the two lips to meet. This protrusion remained after the teeth were removed. I dissected the gum about a quarter of an inch above the edges of the alveolus from the bicuspids forward, and to some extent posteriorly. I then used a small circular saw on the dental engine and cut across a quarter of an inch upward from the alveolar ridges in front and about half that behind, till I had excised so much of the alveolus and septa that the lips at once came into contact, and the face presented a mild, pleasant appearance. It would have been impossible for this to have occurred if left to natural absorption. It might have been partly produced by pressure, though this would have been a very long, tedious, expensive, and painful process.

One week from excising the process, I inserted temporary gum teeth, which were worn two years. This was too long, and was contrary to my wishes.

The changes in this young lady's appearance can hardly be im-

agined. How any fellow could ever kiss such a mouth, with the deformed and misplaced teeth and coarse protruding, animal-looking mouth, is a mystery to me; I did not attempt it. But I can guarantee that any one who appreciates that sort of thing can now enjoy it to perfection.

SENSITIVENESS FROM ABRASION, AND ITS CURE.

Mr. Arthur Underwood said, in a late meeting of the Odontological Society of Great Britain, he had then under his care a case that puzzled him, and with regard to which he would be glad to get the advice of those present. His patient was a middle-aged gentleman, who had a very fair set of teeth, all healthy, but a good deal worn. The only teeth which troubled him were an upper and lower molar; these were much worn, the enamel covering the cusps being gone, and the dentine exposed. The teeth were, however, completely painless except at one spot in each tooth; but here there was most acute sensitiveness. The spot occupied precisely the same situation in each tooth, being confined to a very minute point of what had been the anterior external cusp. Exposure either to heat or cold gave intense pain. There could be no doubt but that a small filament of the pulp was exposed, though he could not detect any evident signs of this even by careful examination through a magnifying glass.

The question was as to the best way of dealing with such a case. He had first tried the application of strong carbolic acid, but this did no good. He then applied chloride of zinc. This caused intense pain for a few moments, but after two or three applications the sensitiveness was greatly diminished, and eventually he dismissed the patient in a decidedly hopeful frame of mind. But at the end of a week he returned, saying he had been pretty comfortable for a few days after the application, but then the sensitiveness returned as acutely as before. Mr. Underwood again used the zinc chloride, with the effect of giving temporary relief, but he should be glad to hear of some more effectual and lasting method of treatment.—*The Dental Record.*

EDITORIAL REMARKS.

We think there is great danger from the application of strong acids and other remedies capable of killing the pulp; and unless the pulp is actually destroyed there is seldom permanent relief from sensitiveness. For some years we were troubled with extreme sensitiveness on the abraded crown surfaces of our lower molars on both sides. Four years ago we had our son drill a good undercut round the sensitive part as near as he could to the edge of the tooth and cap the whole surface of each tooth with gold and platina alloy. The bicuspids had to be built up a little also so as to bring all to the same length. The process was very painful, but we have had no trouble since.

FERMENTATION.

DR. W. S. ELLIOTT.

[Before the First District Dental Society of New York.]

Progress in the science of our specialty has led to the consideration of subjects deeper in significance than was formerly thought pertained to practice. Lifted from the mechanical plane of our work to the cognizance of function in the living body, we exercise the same spirit of penetration as when studying the powers of the pulley or wedge, the inclined plane or screw ; and we claim it to our credit that important questions are solved through our associate effort.

I will refer to a subject animating the world of thought,—one which bears strongly on our well being, and which must command the attention of all who claim to be instrumental in ameliorating sufferings. Modern investigation, specially microscopic, has given us something important to study.

Function is common to all life, and is graded to the requirements of the individual. Normal changes follow the impress of type, but deflected energy indicates disease. The attending phenomena demand at this hour our closest consideration. The germinal cell has its limitations of destiny defined according to its descent. Accordingly we note the conditions attending the low order of being as guidance to the study of the most advanced pertaining to our own organism. In chemical action we note the perturbation of force. In biological phenomena,—life manifestation,—besides the simpler changes of affinities, there are associated other operations which are not so easily defined, and which we estimate from a higher stand-point. Here we pause to make our special inquiries. Our interests have been recently drawn toward the so-called bacterial or germinal aspect of disease, and we have questioned the influence of these micro-organisms. True understandings have been difficult of approach, and I think little has been demonstrated.

We have, however, long enough studied the phenomena of fermentation to be able to draw some analogous conclusions. The brewer and the vintner learn by observation the condition attending the production of spirits. The scientist has sought to learn how fermentation is effected ; and here, should our attention be first directed in our studies into these newer theories of disease. To Lavoisier we owe a debt of gratitude for his researches in this direction. Stahl was prominent in his inquiries, but held a very crude idea of the nature of fermentation. It was not until the beginning of the present century that any true conception of the phenomena was entertained. Pasteur, perhaps, is the most prominent man of modern times who has carried conviction to those who doubted, and his views are very generally accepted.

In the introduction of a late work on this subject the author lays some stress on the recognition of a special force in all biological manifestations as indicating a distinction between chemical and vital phenomena. Whatever views may be entertained it would seem that fermentation was a vitalized process—that the living globule was essentially the prime factor of the changes. The chemical atom and the molecule of the physicist are fixities. The biological molecule and the integrated cell become active integers in the progressive steps toward tissue building, but these have their limitations.

We may watch with interest the budding of the yeast-globule. We see it through various stages of being, gradually approach its adolescence, when the round of its life is completed. The yeast-globule is a living body, and like all such it performs the function of respiration, in assimilating nutritive material and rejecting that which has become effete. Water is necessary to the life of the globule, and from this, as from other associative media, does it breathe in the O of vivification. Where there is engagement there must also be disengagement of affinities to constitute the phenomena which fall under observation. The assimilated O now loses its distinctive character, and, having become joined to C, is exhaled as CO_2. Pure water is, however, too staple a compound to be thus easily acted on and decomposed; but let a portion of grape sugar be therein dissolved, then will disintegration ensue and the yeast be energized to its maximum degree. After a period of incubation—say 24 hours—there will be a disengagement of microscopic bubbles, which on test prove to be CO_2; carbonic dioxide. This is essentially a product of combustion—a chemical reaction. There is a splitting of the molecule of sugar into its elementary constituents with the production of—besides CO_2—a quantity of ethylic alcohol. Thus:

$$C_6\ H_{12}\ O_6 = 2C_2\ H_5\ HO + 2\ CO_2$$

Grape Sugar. Alcohol. Carbonic Acid.

Now, it is evident that, through the respiratory energy of the ferment, the O of the sugar has been assimilated, and having united with the C, has been expired as Co_2, and alcohol left as a resultant product. With the recognition of the living capabilities of fermentation, we are led to regard other manifestation as having a similar relationship, and we may set aside the theory of catalysis, as giving no explanation. It makes no difference whether these ferments are isolated, or form an integral part of a more complicated organism; we study the process from the same basis.

The entrance of a living cell into a territory affording suitable pabulum for its maintenance, growth and duplication, will inculcate abnormal changes recognized as disease, though this is not the cause of every ailment.

I have referred to the familiar instance of alcoholic fermentation, under given conditions. Let these conditions be varied, and we will see what are the variations of product. Complete combustion declares itself in the production of CO_2 and water. But in this case let the combustible body be the alcohol of the former reaction. Under this the alcohol disappears and gives place to acetic acid, having to this end imbibed a necessary equivalent of O from the atmosphere. The change is thus expressed:

$$\underset{\text{Alcohol.}}{2C_2\ H_5\ HO} + O_2 = H_2O + \underset{\text{Acetic Acid.}}{C_2\ H_4\ O_2}$$

There can be no acid without fermentation. While fermentation absorbs O and gives out CO_2, the maintenance of it requires a nitrogenous element for its own nutrition. Thus, if any ammoniacal compound—say the tartrate of ammonia—is introduced, the rapidity and perpetuation of the fermentation is greatly enhanced.

We have separated these phenomena, but have made no allusion to the differentiations which really occur in the fermenting body. Whether this be a direct transition of the one kind of cell to that of another, or whether two distinctive cells exist, I am not prepared to say. The structure and method of duplication of the yeast-cell are shown in the diagram. As compared with this is the mycoderm of the acetic fermentation, which consists of very minute elongated cells connected in chains or in the form of curved rods. These belong to the family of bacteria. Other forms of fermentation, as lactic, ammoniacal, and butyric, bear also the same relationship to organized bodies as promoters of the observed changes of which we have spoken.

The conclusion to which we come, and which is supported by the highest authorities, is that in all instances of fermentation we must look to the intervention of a living proteide as the prime factor in the changes, and that the fermentable substance must contain sufficient nitrogenous elements to support the respiration and nutrition of the ferment. This conclusion having been reached, we naturally go back to ask, What is the origin of the ferment? Here we enter debatable ground, for the question involves all the theories set forth by the spontaneous generationists and their opponents. Whatever may be the generative force working on and in the inorganic material, we know there has not been, and we cannot conceive how there can be, any positive demonstration of a transition from dead matter to a living conscious body. We must, then, accept this one postulate, that the cell-body exists and that it is endowed with an energy qualified to its own maintenance and the duplication of its kind. But within the life-sphere we may more profitably trace the various conditions and habitat of these minute organisms. This has been the work of emi-

nent modern investigators, and the literature of the day is quite abundant upon this question. It is recently announced that the cholera-germ has been demonstrated, and with the same surety that has attended the discovery of the germs of tuberculosis, diphtheria, etc.

Applying these observations to our own work, we will proceed at once to question as to their significance. The histo-pathological nature of caries of the teeth has been of late an absorbing topic of discussion, and it has not escaped the notice of investigators that in all these phenomena micro-organisms play an important part. The assurance, too, is preponderating that, unless these organisms are annihilated, we have no prospect of permanent success in treatment.

Having reviewed the conditions favorable to the life of the bacteria, we would desire to be enlightened as to those of an opposing quality. Empiricism has led to a considerable degree of success in practice, and it becomes us to seek such progressive measures as are therein indicated.

It has been shown that O is an element necessary to the life of the bacterial cell. We understand its vivifying agency to the normal tissue, and in the struggle for existence vantage ground is gained through its superior natural endowment. But while O is the element of the respiration of the bacterial cell, an excess is equally as detrimental in checking its activity and multiplication. A correlation of force seems as necessary here as under higher physiological states. The administration of oxygenated medicinal agents seems to corroborate this view. Thus, we find favorable results in the topical application of permanganate of potash and peroxide of H, not only in the reduction of the disintegrated products by oxidation, but in the checking of the functional activity of the parasite. Other agents, classed as anti-parasitic, are doubtless as useful under such modifying conditions as are coincident to their powers. These are carbolic acid, creasote, listerine, corrosive sublimate, sulphurous acid, boracic acid, iodine, bromine, chlorine, etc.—*Cosmos.*

In the attachment of artificial teeth to the roots of teeth, a very great stride has been made in the last few years. Various methods have been developed to a very great degree of efficiency, and most of these are well worth attention and employment. Of the various methods now before the profession it would be difficult to find a good root of a tooth on which a useful and comfortable crown cannot be inserted. With these various methods it is important that every member of the profession should become familiar, that the largest sphere of usefulness may be served by their application.—J. TAFT.

ART IN DENTISTRY.

DR. L. P. HASKELL, CHICAGO, ILL.

Considering the great number of Artificial Teeth now in use, it is surprising to what extent *Art* is ignored in their construction. Dr. W. W. Allport, in a lecture before the Boston Academy of Dental Science, remarked on this subject:

"He who has but moderate ideas of symmetry, harmony of expression and color, is constantly pained by the lack of that artistic selection and arrangement of artificial teeth which serves to restore to the face the shape and expression left on it by the Creator, the absence of which in artificial dentures stamps him, who should be an artist, and an *artisan—a mere ignorant mechanic—a libeller of the soul—a deformer of the human face divine.* That mechanical dentistry should have very largely fallen into the hands of this inferior class of practitioners will hardly be wondered at by those who have watched the history of this branch of the practice. For so simple are the modes of attaining tolerable mechanical results, with the methods now usually employed in this department, by the use of rubber plates and 'gum sections,' that a high order of appropriate talent is seldom found devoting much time to it."

Artificial teeth are often detected by the practiced eye without the patient opening the mouth, by the unnatural expression resulting from badly arranged dentures, not only of the teeth, but of the artificial gums, whereby the contour of the lips should have been restored. And when the mouth is opened the effect is heightened by the presence of teeth selected and arranged without regard to the person's *individuality.*

It is a marvel that persons of a discriminating taste and judgment in other matters should so often be content to endure such miserable apologies for teeth, involving, as they do, important relations to the features. In no other matters will persons submit to such impositions.

Nothing that is worn on the person is of so much importance to the personal appearance as the set of Artificial Teeth, and requiring, for successful results, artistic and mechanical skill, patient labor and experience.

Remember, that a row of teeth arranged in a circle, on a rubber plate, are a poor apology for what nature once provided, and in order to realize all that is possible, other materials and methods, together with skill and experience, are essential requisites. It has been well said:—

"All works of taste must bear a price in proportion to the skill, taste, time, expense and risk attending their invention and manufacture. Those things called dear, are, when justly estimated, the cheapest; they are attended with much less profit to the artist than those

which everyone calls cheap. Beautiful forms and compositions are not made by chance, nor can they ever, in any material, be made at small expense. A competition for cheapness, and not for excellence of workmanship, is the most frequent and certain cause of the rapid decay and entire destruction of arts and manufactures."

WATTS' CRYSTAL GOLD.

J. F. P. HODSON, D. D. S., NEW YORK.

[Read Before the New England Dental Society, Boston.]

"Watts' crystal gold," as is clearly shown under the microscope, is an interlaced mass of perfect golden fern leaves, that are deposited from and in the continuously saturated solution of gold by a process of electrical action, while all other crystal gold that I have ever examined shows no organization whatever, but is a mere agglomerated mass of gold particles which cohere temporarily like wet sand, and afterward disintegrate like dry sand. Others are produced by chemical action, mercury, etc.; methods which were experimented with and abandoned by Watts twenty-five years ago.

I have used this beautiful form of gold exclusively for more than fifteen years, and other golds before that time. All operations which can be accomplished with any other gold or by any operator can be as perfectly accomplished with this, and with less expenditure of force and strain, and, indeed, in every sense far greater ease of manipulation than with foil golds. Crystal gold, moreover, possesses some excellencies which we do not obtain in foils, one of which is the steel-like hardness of surface of the fillings produced with it, which in grinding surfaces is so specially valuable for their resistance to, and withstanding of, the battering force of mastication and of the cusps of opposing teeth, and in the exquisite perfection with which it adapts itself—*under proper and honest manipulation*—to the walls of the cavity. Indeed, so close and perfect is this that the delicate pointings of the microscopic crystals have been shown to have entered the open ends of the dentinal tubuli. This waxy adaptiveness would be under any circumstances a most valuable attribute, but it becomes doubly so when taken in connection with the fact that the gold is condensed with so little force as compared with foil. In such circumstances, for instance, as very frail front teeth, where, for the sake of appearance, it is often expedient to save every atom of even thin remaining enamel, the value of this quality in crystal gold is inestimable. I wish to be perfectly understood with regard to the condensation of crystal gold in these instances. The filling should be, and of course is, with faithful manipulation of this gold with small points, practically as closely adapted and as well consolidated against those walls and throughout

the filling as if against strong walls, and all this where a proper condensation of foil would be far more likely to rupture the enamel, even granting to the foil the most skilful manipulation. If crystal gold can be depended on to do such delicate and refined work among "egg-shells, I deem it a work of superrogation to more than suggest the point to intelligent professional gentlemen, what must be its capacity for easy and perfect adaptation in the great mass of the usual cavities having strong walls. This wonderful combination of all the compliant and waxy characteristics of "soft" foil with even more of the cohesive quality than is possessed by most cohesive golds, and superadded to this a very hard finished surface peculiarly its own, are the especial characteristics of Watts' crystal gold.

Though I always have a quantity of golds in my gold drawer and obtain most of the new varieties as they appear, keeping them often even on my trays, because I despise the prejudiced and obstinate riding of a hobby, and always feel ready to use any gold or any material with which I can produce the best results in each case, I am nevertheless unable, as a general rule of every-day practice, to find any place where I can employ them to advantage as compared with crystal gold. I am constrained now and then to store away the pellets, cylinders, etc., in the body of large fillings *to get rid of them*.

One exception, however, to my exclusive employment of crystal gold is, as a mere matter of extra prudence, my habit of binding together a largely built-out restoration in gold with occasional narrow strips of heavy foil, feeling that the magnificent hardness of crystal gold might possibly militate against the toughness and consequent integrity of a long, thin restoration. I never hesitate about doing any operation with crystal gold. I depend on it for all dental fillings or restorations, small and great, easy and difficult; and if any failure occurs I know the failure to be consequent on defective manipulation. For instance, if I were to "take a piece of crystal gold as large as the cavity," (as for many years the instructions accompanying it directed, and as some operators who use it apparently do now) and jam and plaster it into the cavity, trusting to some magic of affection in the gold to seek the walls and cling to them, I should expect the leaky and worthless filling so often seen. Notwithstanding the beautiful, even silky, softness and pliancy of crystal gold as it takes its place in the cavity, it quickly becomes hard under manipulation, and being highly cohesive must be treated, after this first placing in the cavity, like cohesive foil. If crystal gold be given the same honest care that a conscientious operator would, in like circumstances, apply to cohesive foil, it will produce the same perfect filling, and also give the grand combination of the special beauties and advantages contained in *both* soft and cohesive golds.

The first pieces of crystal gold must be made immovable before other pieces are added. Retaining points, at an angle of the cavity, may be employed for the purpose. My decided preference, however, is to depend mainly on the general shape of the cavity, rather than by means of the deep pits so often employed, as I greatly deprecate any unnecessary reaching out toward the pulp with conductive material. The first pieces may be held accurately to their position by means of a pointed instrument in the left hand, continuing its employment till in condensing these first pieces and proceeding with the stopping, the shape of the cavity is found to hold the gold securely without it. Each piece is condensed exactly as a careful operator would proceed with cohesive foil. Crystal gold when first applied to the cavity is waxy and adaptive as is the softest of soft foils, but here the similarity ends. This first application being made, the piece must be treated precisely as though it were cohesive foil. A good operator when applying a cohesive foil pellet to the cavity would not proceed to disintegrate it by punching it full of holes with a sharp point; neither would he attempt to model large, thick pieces of it into position with "spoon" modelers: such manipulation would produce a worthless, uncondensed mass, full of something akin to loose shavings or sheet-iron scraps. Neither would he jam a large mass of cohesive foil into a cavity, and by thrusting wedge-shape instruments down through it except to force it to spread out sidewise and form a perfect adaptation to the walls of the cavity. And yet operators commit all of these sins against crystal gold, and then shower maledictions on it.—*Independent Practitioner.*

AMALGAM.

There are a great many in the profession who cry down amalgam fillings, not because they think they will not save teeth, but because they say that the mercury they contain has an injurious effect on the health of the patient. For the benefit of those who take this ground, and the fact that it comes legitimately under the head of chemistry, I have here a very delicate test for the presence of mercury, either free or in combination with metals, as we find it in amalgam. By taking a solution of nitrate silver and adding ammonia until it becomes cloudy, and then adding enough more to make a clear solution, and using this as an ink to write with, and placing the paper over the amalgam plug and allowing it to remain in the dark the writing turns dark, showing that the mercury is constantly giving off fumes. I have performed this experiment with an amalgam plug that was in a tooth 42 years, and it apparently gives the test as well as a younger one, and the beauty of it all is that the patient's health was not destroyed.—Dr. W. H. Taggart.

THE PHENOMENA AND CAUSES OF CARIES.

DR. HENRY SEWILL, ENG.

First, the anatomical characters of enamel and dentine are such as preclude the possibility of these tissues either initiating or carrying on any pathological process; at least we have no explanation of the pathological change in structures of such a character. Secondly, we have the facts established that the appearances in carious teeth are all interpretable as changes due to disintegration, unaccompanied by vital reaction of any kind; and thirdly, *caries of dead teeth retained in the mouth is identical in all its objective phenomena with the disease in living teeth.* This last fact alone is surely enough to establish the truth of the definition of caries with which I started, that caries is disintegration, and not dependent on vital action.

Before proceeding to the next link in the chain of my reasoning, a few more words must be added as to the sources whence are derived the acids—the active agents in initiating caries. These acids, principally malic, butyric, and acetic, are mainly the products of chemical change and fermentation, set up in fragments of organic matter—food, mucus, and epithelial scales—which are commonly present in the mouth, and lodged on the teeth.

Acid may be derived from several other sources. It may be secreted by the mucous membrane. The normal secretion of the membrane is small in quantity and slightly acid. In health the acid is at once neutralized by the alkaline saliva, with which it mingles; but when the membrane is inflamed the mucus increases and becomes more acid. Then, again, many forms of organisms themselves produce acid. Acid is eructated in many gastric disorders; and an acid, instead of alkaline, reaction is shown by saliva in several diseases.

The next topic in continuation of my argument will be the examination of the predisposing causes of the disease. If our view of the nature of caries be correct what can be the predisposing causes of the disease? These are, first, innate structural defects in the teeth, pits and fissures in the enamel and dentine. These vary in extent between minute cracks perceptible only under the microscope, and cavities plainly visible by the naked eye. They may penetrate only the enamel or may extend into the dentine. Prof. Wedl especially notes that minute cracks, often only visible under a low magnifying power, are to be found here and there in enamel, even of the best quality.

Defects in the quality of the tissues may affect the whole body of the tooth, or may be confined to certain spots in the enamel and dentine. The durability of the dental tissues varies considerably—in one individual the teeth withstand hard usage and neglect; in another they show traces of disease within childhood, and are destroyed in spite of active treatment. Enamel and dentine in the child present

well-marked evidences of imperfect formation. The enamel instead of being a densely hard, almost homogeneous mass, is comparatively soft, owing to imperfect calcification, and porous in consequence of incomplete coalescence of its formative elements. It retains a distinct fibrous character. The fibers are imperfectly blended; their tranverse striæ are clearly evident, and they are often penetrated at their centers by tubes or small cavities. At parts the fibrous character may be lost, the tissue consisting of an imperfectly united granular mass.

The dentine in such teeth, by its softness, exhibits specially immediately beneath the enamel, patches of defective tissue similar to the granular layer, which in well-formed teeth exists only at the point of juncture with the cement. In the spaces within this defective tissue—sometimes called interglobular spaces—the tubes end, or they may run on and terminate in extremities within the substance of the enamel.

All these structural defects may not exist in one tooth. They vary in degree and character. In teeth of otherwise good organization one or two pits or fissures, or small patches of defective tissue, are often found; while in teeth of generally inferior structure there are portions of still lower formation.

It is easy to perceive how these structural defects furnish lodgment for acid-forming substances, and render the teeth more easily acted on. The fact that these innate defects vary infinitely in extent and character in teeth of different individuals, must especially be borne in mind.

We know very little of innate structural defects. We know that inherited syphilis leads to imperfect formation of the tooth; and the characteristic short, narrow, peg-shaped, notched incisors furnish testimony to the presence of the hereditary taint. It is, however, comparatively rare to find this typical form of defect in syphilitic children. From many cases of children undoubtedly subjects of syphilis which I encountered in hospital practice, not one per cent. displayed the dental sign. Many possessed teeth perfect in form and beautiful (for their whiteness) in color, but I have never seen a syphilitic child with other than ill-made dental tissues—as evidenced by the early onset and rapid progress of caries. I have therefore concluded that hereditary syphilis always causes dental deterioration, though it may not often leave an unmistakable mark modifying their external form. Teeth with enamel full of small pits, though sometimes mistaken for syphilitic teeth, are found in many instances in which convulsions have occurred during infancy. This points to some interference with the development of the same series of embryonic structures, and it has been sought—without complete proof—to ascribe these cases to the administration of mercury.

Beyond these facts, the whole subject of the origination of dental deterioration is still in the region of hypothesis; yet we know many individuals with ill made teeth. It is comparatively rare among highly civilized races to find an individual with good teeth. No doubt dental deterioration has accompanied civilization. This may be largely accounted for by the comparative disuse of the dental organs to which civilized and luxurious habits lead. A high standard of physical comfort implies comparative disuse of teeth and jaws. The advance of the art of cooking, with flour refining and soft bread making, renders all food so soft that it calls for little chewing. Disuse of the organs of mastication leads in time to their wasting; characteristics of parents are transmitted to their progeny, till at length a deterioration commenced in one becomes a family defect, and, finally, a generation is produced in which teeth, muscles and maxillæ are inferior. Evidence of the influence of heredity on dental development appears daily. Children's jaws and teeth commonly resemble those of one of the parents. Abnormalities such as "underhung jaw," the absence of a particular tooth, or the malplacement of one of the set, frequently run through a whole family. The occurrence of visible patches of defective enamel, or the onset of caries in corresponding teeth, are frequent family traits.

A predisposing cause of caries is crowding and irregularity, due to a small and malformed maxillæ. It is the exception to meet with a case in which at least some crowding of teeth does not exist—often there is no room for the wisdom teeth, and the others overlap each other. Such crowding and irregularity favors the accumulation of decomposing foreign particles in the narrow spaces between the teeth, and in the nooks and crannies formed by the irregularity. And the fact on which I lay stress is that this irregularity and crowding of the teeth vary much in different individuals.

Caries is also promoted by diseases which vitiate the oral secretions; or tend to the formation of acid, and the accumulation of decomposition. This is, perhaps, the most important of the predisposing causes of caries. Wedl, in his great work on the pathology of the teeth, classes caries under "Anomalies of the Secretions," holding that it is not really a disease,* but rather disintegration of the teeth resulting from the physical effects of the morbid secretions. With a free flow of healthy saliva, and a proper secretion of normal mucus there would be much less caries. There is hardly a disease which is not attended by some vitiation of the secretions of the mouth. During some diseases the secretion of saliva is scanty, often almost suppressed, and the teeth remain, perhaps for weeks, coated with sordes—accum-

[* Of course, if the teeth are not living organs, as we understand you to assume, they cannot become diseased.—Ed. Items.]

ulations of epithelial scales, viscid mucus and other foul secretions, crowded with bacteria and overgrown with leptothrix. The condition of ill-health sometimes accompanying pregnancy furnishes another instance in point. In most of these cases the symptoms are mainly referable to disorder of the digestive organs; the appetite is morbid and capricious; vomiting and eructation of food constant; the tongue is foul, and the gums very frequently in a condition of chronic congestion or sub-acute inflammation attended with erosion of epithelium and secretion of muco-pus or tenacious mucus round the necks of the teeth. Then in gouty attacks the saliva has often an acid instead of alkaline reaction. In scrofulous subjects there is commonly a characteristic condition marked by chronic congestion and swelling of the gums with secretion of viscid mucus. Some phases of syphilis and of phthisis, diabetes, chlorosis, and chronic alcoholism are marked by congestion and inflammation of the gums, by stomatitis in some form, or by distinct and easily recognizable morbid changes in the secretions of the mouth. It is needless to multiply instances. If these facts be borne in mind there need be no difficulty in understanding how caries is often coincident with the outbreak, and its advance simultaneous with the progress of disease.

BRIDGE WORK.

DR. D. F. M'GRAW, MANKATO, MINN.

[Part of Paper read before the Minnesota Dental Society.]

We use block tin for measuring the teeth adjacent to the space to be supplied. It is rolled out to 28 or 29 stubbs gauge. The tin is carefully bent round the tooth and pressed with flat pliers the length of the tooth, thereby giving a perfect form of the tooth. The tin is then taken off and cut by the mark left by the pliers and is used as a pattern from which a gold band is made. These bands are then beveled, bent into shape and soldered. The bands are made from American coin gold rolled to 27 or 28 stubbs gauge and the solder lacks only one carat of being as fine as the band, thereby giving nearly the strength and exact the color of the gold used.

The bands are fitted by being slowly driven over the teeth with frequent annealings and cutting of points likely to come in contact with the gum till the edge of the band is the shape of the process. It is then removed and the edge nicely beveled with a fine file, replaced and driven up till the beveled edge extends under the free free margin of the gum. Then cut away the outer portion where it might show a narrow band, leaving the rest of the band full till adjusted. Thus ends this part for the time being. An impression is now taken in the best yellow beeswax, also an articulation, and your patient is dismissed.

A model is made and articulated and the teeth ground up and waxed into position, great care being taken that only the points touch the gums. If it be a case of the six superior or inferior teeth the cutting edges are beveled from the palatine or lingual surface to the labial surface, in order that the platinum backings may lap clear to the labial edge, and thus bear the force of mastication instead of the porcelain.

The teeth are then removed from the model and placed in chloroform to remove every particle of wax. They are now carefully backed with platinum and invested in plaster and fine river sand. After the investment becomes hard, the platinum backings are coated with borax and placed over a gas heater to dry. After thoroughly drying, a backing composed of 80 per cent. coin gold and 20 per cent. platinum is flowed over the platinum backing. This gives an exceedingly hard masticating surface that is not worn away by attrition. The teeth are allowed to cool and are then filed up and laid aside to await the next step in the process.

The bands are now again placed in position and an impression taken in plaster. The impression is removed, and the bands are taken from the teeth and accurately fitted into their position in the impression, which is then varnished and a model made upon which will be found the bands on separating. The teeth are then waxed into position, and as much of the model cut away as can be spared without weakening it. The model and teeth are then invested in plaster and sand, leaving the palatine surfaces of the teeth and bands exposed. After the investment has hardened, the wax is removed and the backing of the teeth and bands coated with borax.

The spaces between the teeth and bands, and the teeth themselves, are filled in with platinum scraps and gold foil, which in turn is coated with borax.

The investment is then placed in the heater and allowed to dry, and then soldered, using the same kind of solder that was used on the bands.

The bridge is now ready for finishing and placed in the mouth and any mal-articulation corrected. It is now removed and the teeth which are to receive the bands and the gums dried. The gums are painted with tincture of gum benzoine to keep out all moisture. The assistant has in the meantime mixed some of Moffit's cement, which is the best for this work and coated the inside of the bands and the teeth which are to receive the bands with the cement, when the bridge is gently driven into position. After it is in place, if the bands do not touch the teeth at all points drive up the edges with smooth foot plugger before the cement has hardened.

Remove all superfluous cement, bevel the remaining edges of the bands and polish. Your work is finished.

For the back teeth the same plan is pursued, except the substitution of cuspids for bicuspids and wide central incisors for molars. These are backed with platinum, and a gold masticating surface is struck up in a Knapp die, the porcelain serving only as a face, which is protected by the gold masticating crown which overlaps it.

Where bands are attached to the bicuspids or molars the gold is allowed to lap between the cusps of these teeth to prevent the bridge from crowding down onto the gums in eating.—*Archives.*

DISEASES RESULTING FROM DECAYED TEETH.

[Mrs. M. W. J., in " A Mother to Mothers."]

The tooth is an integral part of the human body—"nourished by the same aliments, vitalized by the same blood, pervaded by the same nerves"—as the heart, the lungs, or the brain.

The stomach is the great laboratory of the human system. Dr. Edward Nelson says: " For the proper performance of its functions, it should be in healthy condition; but this may be seriously deranged and the whole economy thrown into disorder, and even fatal consequences result from intense pain, as it shoots and vibrates along the nerves from the swollen and inflamed pulp of a single tooth."

The first and inevitable effect of decayed teeth on the general health is indigestion from insufficient mastication, and the swallowing of the vitiated fluids of the mouth.

The digestive organs ceasing to do their duty, "the blood becomes vitiated, and the whole organism becomess enfeebled, with its attendant gradual wasting and loss of vital power."

Frequent indigestions result in chronic *dyspepsia, gastritis, enteritis* and *death.*

Neuralgia, in connection with decayed teeth, is too common to need mention. Another consideration is that even the extraction of decayed teeth becomes a fresh cause of neuralgia, thus affording a double reason against allowing the teeth to decay.

The effluvia from decayed teeth poisons the breath, and entering the lungs becomes a potent factor in the causes of *consumption.*

The discharging pus from diseased gums and decayed teeth, poisons the secretions and the blood, resulting in *septicemia* or blood poisoning.

The lamented Dr. J. Marion Sims, of New York, says; " Decayed teeth, with matter exuding from round the teeth, are the means of producing more *nervous disorders,* more terrible consequences to the general health, than almost any other thing that can

happen. * * * It is a matter of regret that medical men generally have so little knowledge on this subject."

Dr. N. E. Hollace, of Boston, says; "The bad effects of a diseased and unclean mouth on the general health are of a more serious consequence than most physicians are aware. In twenty-four hours we breathe twenty thousand times, and what must be the effect on delicate structure of the lungs when for days, months and years, the air we breathe is drawn through a depository of filth, and is poisoned by being mixed with effluvia rising from decayed teeth and ulcerated gums."

An English physician relates the case of a gentleman, pronounced by one of the highest medical authorities of the day to be afflicted with *cancer of the stomach*, twenty years ago, to whom it was proposed to have his decayed teeth removed, and an artificial set inserted. He says: "This proposal seemed almost a mockery to a man who had just been assured that he was gradually sinking, from an inevitably fatal malady, but it was acted on with the result that the patient soon regained his digestive power, and is now a fairly vigorous man of 80 years of age."

Dr. Barnett says; "It has long been known and recorded in medical literature that a peculiar sympathy exists between the ear and the teeth," while Dr. Edward Woakes, in his work on deafness, etc., traces this same connection through "the clear channel of nerve communication."

Pages could be filled with similar cases, but surely enough has been said to show that the tooth-ache excruciating as are its agonies, forms but a minor part of the evils resulting from decayed teeth, though Dr. Hollace says mere pain is fully capable of deranging the whole economy, and inducing serious and fatal disorder."

There is another point to be considered.

Though *health* is of the first and prime importance, *beauty* is a matter of no small consideration.

A prime factor in beauty, and the most expresssve feature of the human countenance, is the *mouth*, and the expression of the mouth depends largely on the teeth. "In vain will the eyes sparkle with joy and delight, if the lips are compressed to hide a mouth full of defective teeth. The whole countenance, beaming with brightness, loses half its charm by the exhibition of foul and unsightly teeth. Half the charms of real culture are lost when expressed through an unsightly denture, and the expression of sorrow and grief is made hideous by the exhibition of this living tomb of decay."

Be more anxious to put wealth into the head and heart of your children than into their pockets.

ARSENIC.

W. H. TAGGART, D.D.S., FREEPORT, ILL.

Another of our common remedies, that has a few interesting chemical thoughts connected with it, is arsenic. This is a remedy that does not lose its identity very readily; in other words, it remains as arsnic, I suppose, for an indefinite period, and may be detected as a poison months and even years after it has been used. I have here a solution made from the pulp of a tooth destroyed by arsenic; the remedy was allowed to remain in the tooth two weeks. I have very carefully followed the rule for detecting arsenic by Marsh's test; that is, by testing the purity of the zinc and acid to find that no arsenic was present to begin with. Now, by pouring the solution containing the pulp into the bottle where nascent hydrogen has access to it and passing it through chloride of calcium to absorb all moisture, and by burning the gas, we have formed on a piece of cold porcelain held in the flame a characteristic black sooty deposit. [Experiment.] This is a very delicate test and accurate, for we cannot get this same kind of a spot from any other substance that we can use. It is said that the one seven-thousandth of a grain can be detected. This test was performed with the small end of the pulp, showing that the arsenic was absorbed into the pulp and was not merely on the surface, as some say. To show the destructive effects which arsenic has, and to show what might come from the careless use of this remedy, I have here a piece of the process from around the roots of a lower molar, the death of which was caused by the careless use of arsnic. It seems the patient, a young lad sixteen years old, went to a dentist to have an aching tooth extracted. The dentist pulled the crown off, leaving the pulp entirely exposed and the roots still in their place; of course it ached fearfully, and the boy was afraid to have it touched with the forceps again. The dentist said he would destroy the nerve by putting medicine on it, so he put arsenic directly on the exposed pulp and bleeding gum without any precaution whatever. In the course of a few days the face commenced to swell and the patient fell into my hands, and a worse gangrenous looking mass could hardly be imagined than that presented by looking into his mouth. In the course of a week the gum had all sloughed off that side of the jaw, and the process around the broken tooth and the adjacent ones began to come away in pieces. This piece I show you was the largest one, and was the process from around the broken tooth. Immediately after the patient came into my hands I took away as much of the diseased parts as I could get, and made the test as just shown, and found arsenic. This shows conclusively that the remedy used was arsenic, and it also shows the results that may follow its careless use.—*Dental Register.*

OUR RESPONSIBILITY.

If we examine the human hand we find it composed of twenty-seven bones, which have a mutual relation, with cunningly devised hinges by which the end of the one moves on the end of the other. These relations of the bones are maintained by numerous ligaments, bearing certain relationships to the bones and to each other. Again, we find these are threaded throughout by tendons, to which are attached muscles, by the contractions and relations of which the movements of the hand are accomplished. But this is not all of the hand. It is only the grosser mechanics of the hand. Like all other parts of the human frame it contains in that which is destined to minister to the life of the organ. It is pierced everywhere by minute tubes, arteries, capillaries and veins through which the blood comes and goes for its nutrition, that life may be maintained within its structure. Then we find it pervaded everywhere with nerves through which it becomes obedient to the great central organ, the brain, by which its movements are guided, and without which the whole organ, be it ever so perfect, would be useless to the other parts of the body. All of these we find enveloped in the skin where the tactile sense is located. All of the parts are woven into one perfect whole, and all are minutely dependent on each other. Without any one of them, or if any become maimed or imperfect, the hand becomes useless, and the whole body suffers in consequence. As with the hand, so with the other organs of the body. Each is made of parts mutually dependent on each other; and each organ is mutually dependent on the other organs of the body.

Society is similarly framed. Each business or profession has its place of labor and all are mutually related and dependent on each other. The welfare of the community depends on the skill and the sincerity with which labor is performed in each case, for it is these units that make up the whole. If the physician neglects his duty or performs it in a bungling manner, or proves incompetent, an individual is injured. Society has suffered in the person of one of its members and has a right to complain. This person has also brought a reproach on his profession. The same is true of individual actions everywhere, and in the professions especially. For we of the dental profession become by virtue of our special studies, not only the servants, but the advisors of other members of society in matters of the gravest importance, and society has the right to demand that we be well qualified.—*Prof. G. V. Black.*

Be faithful to your business and your business will be faithful to you.

DR. J. TAFT ON CONTINUOUS-GUM WORK.

Prof. Taft, editor of the Cincinnati *Dental Register,* who has used it in his own practice for many years, says of this work:—We have often taken occasion, in the pages of the *Register,* to direct the attention of its readers to continuous-gum artificial dentures. It is a matter of regret that this, the most perfect method and style of constructing artificial sets of teeth, should receive so little attention and be employed so seldom as it is. Perhaps not more than one dentist in fifty knows anything about making it, and some who have been taught the method of constructing it ignore it altogether in practice.

Now why is this? A very common answer is, 'Oh, it is too expensive.' There are dentures of other materials, much cheaper, so far as first cost is concerned, than continuous-gum, but there is less difference in the cost than in the value.

The difference in the expense, however, is not the main difficulty. This consists chiefly in the fact that so few understand anything about it, even as to its value, and much less about the mode of constructing it.

The great majority of dentists represent to their patients that a plate of rubber with fourteen teeth, set in a half circle, is just as good as anything else for a denture. Some make such representations knowing them to be false; others make them under gross ignorance.

The responsibility for this condition of things rest on the profession. A great many persons accept these miserable apologies for dentures as a last resort, knowing that there are far better things. Then again there are a great many who are ignorant of what is best, but desire to be informed and advised, and are always ready to acquiesce in the judgment and advice of those whom they regard as capable and honest.

Then, again, as evidence that the people are not wholly, or even to any considerable extent, responsible in this matter, is the fact that there are a few men who use largely, and some exclusively, the best class of artificial dentures—continuous-gum and gold-plate work—and some of these, we know, are not situated among people different from those of communities generally, and yet they have an extensive and profitable practice.

We will use for illustration Dr. Haskell, of Chicago, who confines himself almost exclusively to the production of the very best class of work, and his patients accept that more readily than they would the inferior and pernicious kinds of dentures in common use, and they appreciate it far more highly, and he has a far higher sense of satisfaction and gratification than he could have with any of the inferior things that are in such general use. And what is true of Dr. H. in this respect would be true of any one else who would pursue the same course.

A CASE OF IRREGULARITY.

J. E. MILLER, D. D. S., ST.PETER, MINN.

[Read before the Minnesota State Dental Society, July, 1884.]

A youth, age fourteen, robust, and one of a family of five children, three of them showing the same irregularity in a marked degree, and one being entirely exempt.

The case is one of hereditary irregularity, presenting the following characteristics :—The superior incisors and canines protrude so far, that when the jaws are closed there is between them and the lower teeth a space of nearly half an inch, owing in part to a sightly contracted lower arch. The internal cusps of the upper bicuspids strike on the outer cusps of the lower teeth. There is also a considerable space between all the incisors, both upper and lower.

I shall briefly state what in my opinion are essential points to be taken into consideration before attempting to correct an irregularity of any kind. Irregularities may be divided into two classes. Hereditary and acquired. Of the former we know little or nothing. We can only say what we do of the ryhtmical contraction of the heart, that it is an inherent endowment.

Acquired irregularity, on the other hand, is of a more tangible kind; we can trace it to different and definite causes, such as accident, attrition, unnecessary or premature extraction, thumb-sucking and many other causes.

Three things should be taken into consideration: soundness, durability and appearance—soundness of the teeth, durability of the operation, and appearance before and after treatment.

There are also three principles involved in mechanical treatment: The inclined plain, traction, and the screw.

Of the different appliances in use I am decidedly in favor of those that give an intermittent force, for the reason that parts that are subjected to continual pressure and irritation should have intervals of rest. We must have a certain amount of passive inflammation to induce absorption, but we do not want an active inflammation. It would not only give rise to unnecessary pain, but it would create pathological conditions that must be overcome before we can attain our object.

Time should not be taken into consideration. It is wrong to see in how short a time a tooth can be moved from an old into a new position. It ought not to be done faster than absorption takes place on the one hand and deposition on the other.

To know how fast this is we have only to call to mind the erupting process of a tooth, where we find absorption is cotemporaneous with the advance of the tooth.

We have every reason to believe that absorption will take place as rapidly under artificial stimulation as it does naturally.

If you move a tooth slowly you will be able to dispense with the retaining band as soon as though you had removed the tooth the entire distance in a day; and you do it safely. The treatment of the case in hand was as follows:

An impression was taken and a plate made with extensions around the maxillary tuberosities and forward to the buccal side of the first molars, being careful to avoid pressure on the soft parts. Tubes with threads cut into them for the reception of screws were vulcanized into the extremities of these extensions.

A metal band was constructed to pass around the arch in front, the ends being provided with screws entering the above mentioned tubes.

This appliance though successful in a former case, treated by Dr. Gorgas, of Baltimore, failed in this case, owing to inability to prevent unbearable pressure of the plate on the roof of the mouth.

Another appliance was then made, consisting of bands surrounding the first and second molars of each side; these bands being soldered together, and so united that only one thickness of metal came between the teeth. The anchorage for each side now embraced two molar teeth, to which were attached on the buccal surface of each side, a screw nut fitted to receive the pull back screws with which the long band passing around the front teeth was provided. It is quite necessary to band two teeth on each side to get sufficient support, and to prevent the bands from slipping on the teeth, which would make it rather difficult to turn the screws.

This apparatus moved the incisors and canines very easily. As mentioned, the bicuspids were also everted. These were regulated with a retaining band in the following manner:

A plate was made having a standard vulcanized into it at the center. A wire cable was then made by twisting together four strands of fine nickel plated wire. I think this preferable to a gold band in that it is not so conspicuous in the mouth, easier to adapt, and cheaper in case of breakage. This cable was passed around the front teeth, back to, and through the spaces between the bicuspids and attached to a standard vulcanized into the center of the plate. The bicuspids were brought in by simply shortening this cable as required. In three months the teeth were brought back to the position shown in the model. At the end of another six months the retaining fixture was taken out, the teeth to all appearance being firmly fixed in their new position, and the expression of the patient wonderfully improved.

The retaining fixture should be worn at intervals, until it is safe to withdraw it entirely.—*Archives.*

CARBOLIC ACID.

One of our remedies for alveolar abscess is carbolic acid, our old stand-by. This substance is made from coal tar, and is a more agreeable antiseptic than creosote. That there is a chemical difference between them can be easily shown, and for those who are anxious to know for certain which they are using (as the one is so often sold for the other), the test can be made in a few minutes :

First—Carbolic acid is soluble in glycerine ; creosote is not.

Second—Carbolic acid precipitates nitro-cellulose from collodion; creosote does not.

Third—Carbolic acid gives a brown color with ferrice chloride and alcohol ; creosote gives a green color with ferric chloride and alcohol.

Fourth—Carbolic acid gives a violet color with ferric chloride and water ; creosote gives a green color with ferric chloride and water.

Carbolic acid coagulates albumen, and as albumen is one of the principal ingredients of pus, it is a question whether the wholesale use of carbolic acid in these cases is admissible, especially when the pus is forming. Just the fact that the case gets along well by using it, is not always proof positive that the proper medicinal remedy has been used; for the same case, treated with a remedy that would not coagulate the pus, might have got along much better, and there would not have been the insoluble compound formed for nature to remove by absorption ; in other words, the simple pus would be easier to absorb than the insoluble coagulated pus. Let those who have implicit faith in the action of these remedies (carbolic acid and creosote) in all cases, try treating their next case of alveolar abscess by simply going through the same process with water, and they will be surprised at their success and will come to the conclusion that success in the treatment of alveolar abscess comes in a great measure from persistent *mechanical* cleanliness.

In using either of these two remedies in the cases mentioned, the object is said to be to disinfect the tooth. Now, a disinfectant is a smell-destroyer, and these two substances are disinfectants only in a very small degree, and that small degree is due more to the mechanical removal of the decomposed mass than to any chemical combination caused by the remedies. To show that carbolic acid is not a true disinfectant, we have simply to place it in contact with the most disagreeable odor we have to remove, which is sulphureted hydrogen. I have here some water saturated with this offensive gas; now, by adding the carbolic acid, even in excess, we have no diminution of the smell, simply for the reason there has been no chemical change. If I now add chloride of zinc to the same kind of a solution, a chemical

change takes place, and the smell is destroyed, showing the proper action of a disinfectant. [Experiment.]

To show this chemical change I form the equation H_2S+Zn $Cl_2ZnS+2\,HCl$. In this change the chlorine, which always has a great affinity for hydrogen, has united with it, and thus broken up the compound, destroyed the smell, and formed hydrochloric acid, $2HCl$.—W. H. TAGGART, D.D.S.

Gold Solder.—Dr. Patrick says: The purer the metals used in a solder the better the solder will be. Jewelers never use base metals in their solders. If it is only 14-karat solder, they never use tin or anything else of that nature, because it makes a rotten solder. A properly prepared solder will flow as readily as water; but you cannot make a solder that will relieve you of the necessity of using the blow-pipe. The formula to which Dr. McKellops refers is, gold (the kind you are to use the solder upon whether 18 karat or 22 karat) 89 parts; silver 7 parts; copper 4 parts. After using all you wish to, if any is left, don't put it away for another time, but melt with your plate and roll out. Always make your plate first and your solder afterwards from the plate. Never carry solder over. There is nothing saved by having a poor solder, but when solder is made as here directed you can scarcely tell it from the gold itself; when polished it cannot be distinguished.

A Compliment to a Worthy Man.—Dr. J. L. Williams, in an address before the New England Dental Society, said: "I express my appreciation of the efforts of one whose life has been devoted to the work of elevating our profession by inculcating the importance of a knowledge of general principles in all study and investigation. I refer to our highly-esteemed and venerable teacher, Dr. W. H. Atkinson. It has been said it is, in some respects, a misfortune for a man to be born before his time. No man is *ever* born before his time; but the world has never been without a few who, as Tyndall would say, by an intellectual necessity are constantly crossing the boundary of experimental evidence, and discerning principles, laws, and relationships of matter which are beyond the ken of ordinary men. It is in the very nature of things that these men should be misunderstood and misinterpreted. The reward for their labors must come largely from the delight growing out of a desire to investigate and acquire *truth* for its own sake."

If you would revenge an insult live above it.
Be above seeking revenge.

SUUM-CUIQUE-TRIBUTO!

"NEW MODE OF SUCTION."—NOT NEW!

In substantiation of the above affix I still have the plaster cast from which I constructed an entire upper set of teeth on gold plate, with an obturator for cleft palate, substantially as described under the foregoing caption, while practicing in Memphis, Tenn., prior to our civil war. It was for the daughter of a wealthy Tennessee planter.

And here I will take occasion to say that the much-vaunted atmospheric horse-shoe chamber, in an article translated for, and published in the *Dental Cosmos* August 1880, p. 422, was also conceived and made by me before the fall of Fort Sumpter. A model of which is now in my office, made of galvanized copper.

A quarter of a century ago I experimented with many forms of atmospheric chambers, *i. e.*, the cluster, crescent, cross, diamond, heart, horse-shoe, concentric shields, monogram, etc.; and occasionally mounted an entire upper set of teeth successfully without any chamber. But for many years I have invariably made three atmospheric chambers in all full under plates, with the best result even with (celluloid, thus proving that avoirdupois is not a necessity) and on the alveolar ridge, directly under the central incisors, second bi-cuspid, and first molar, each side. Where the natural incisors remain, I apply the side chambers, about ½ inch long, ⅛ wide, $\frac{1}{16}$ deep.

DR. W. W. MORGAN,
Camden, N. J.

P. S.—I find that "ITEMS OF INTEREST," like wine, improves with age.

ST. JOHN'S, MICH, November 11, 1884.

Editor ITEMS OF INTEREST:

Your postal confirming the worthlessness of "Naboli" is received; but you did not answer my question: *Why* did such men as J. Foster Flagg and James W. Whipple ever recommend so worthless a thing, and do it so thoroughly and ardently? If we cannot have confidence in the statements and opinions of such men in such directions, can we in other directions? What is the world coming to?

Very truly,
G. E. CORBIN.

[Why did they?—ED ITEMS.]

My way of keeping my spittoon sweet or clean of all bad smells is, I keep a quantity of sulphate of iron—copperas—by my sink, and every night after I clean my spittoon, I have a little water in it, and in that water put a teaspoonful or so of the copperas—a very easy thing to do, and the result is always a pure-smelling spittoon.—E. O. P.

NEW GROWTH OF TOOTH-PULP.

DR. BROWN, OF NEW JERSEY.

I think the most of us understand the pulp of a tooth sufficiently. It does a great many queer things. I had in my office some time ago, a young boy, one of the fidgety kind, who had a six-year molar troubling him so much, I could not put an instrument in the tooth to clean it. It was a tooth that would eventually have to come out in order to make room, so I decided to kill the nerve. I applied a preparation to kill it, and supposed it did kill it, for I succeeded in putting a broach down each of the roots, and getting out most of the pulp. After that I could not get the instrument in at all, as his mouth flew shut like a vice. I put a piece of cotton and sandarac in the tooth, with a little carbolic acid underneath. The boy went off somewhere and was away several months. He came to me on his return, and on taking out this cotton and sandarac I found that a new pulp had come, or something else that had all the appearance of a pulp, and not a fungus pulp either, but a normal pulp. I treated it some little time and at last I capped it, and it has been quiet till the present and is perfectly well. I have examined it twice since and found it in good condition, bearing all the characteristics of perfectly normal tissue.

Bridge work ought to be well tested and well considered before general adoption. This is work in which the teeth are placed on a band or bar of gold or other material, that stretches across spaces of variable extent, where teeth have been removed or attachments made to sound teeth or to the roots of teeth that have been decayed, the crowns of which have been removed. In these dentures no plate rests on the gum, the entire support and attachment of the denture being made to natural teeth or roots, these attachments usually embracing a large share, and in many cases the entire crowns of teeth. These attachments are usually made to remain permanently. This is a method of exceedingly doubtful propriety. In some cases which have come under my notice, teeth that were perfect before the operation, have been cut and injured so as to greatly facilitate decay. The drilling, grooving, and slotting in sound teeth for the purpose of receiving such fixtures can hardly be too strongly condemned; and even when this is not done, the application of caps or bands that fully cover the crown or crowns of teeth, will often occasion early decay. In some cases the pressure and straining of such dentures on sound teeth, produces periostial disturbance that results in a chronic inflammatory condition, and sometimes alveolar abscesses. This method of inserting teeth will certainly require much modification before it can receive the unqualified approval of the more intelligent of the profession.—J. TAFT.

FIRST PRINCIPLES FOR YOUNG MECHANICS.

A well grounded knowledge of the great law or principle of conservation of energy should be taught with the multiplication table. It can be so taught if the teachers are certain there is in the universe only so much energy, and that we cannot make one particle more than already exists. With a clear understanding of this principle, no time will be wasted in search after perpetual motion machines, and fewer mistakes will be made by really earnest seekers after improved machines for use or improved methods. When a young man brings to me some wonderful improvement over the ordinary crank motion, some device that is to supersede the crank of the steam engine, a feeling of utter helplessness comes over me; I know not where or how to begin; he has had no opportunity to learn the simple laws of mechanics, and to point out the fallacy of his argument means to teach him the laws of mechanics, so I can only say to him, "Don't," and may advise him what books to read.

We hear or read almost daily of the wonders of science, and what is to be accomplished by electricity. "It is to be the great power of the future." Is it a power now? We may use it indirectly to drive machinery, we may make use of it to propel the cars on our street roads, but is it a power in the sense that steam is a power? Let us think of this a few moments. We call steam a power, and our factories are driven by steam power; or we call water, when falling a power, and we drive the machinery in other factories by water wheels; or we pump water into the reservoirs at Fairmount, Philadelphia, by water power. Where we have no fall of water, and where fuel is scarce but wind plenty, we grind corn in a mill driven by wind, and the wind is our power; these and other sources of power may be called primary powers.

Secondary power is that which is transmitted from the prime motor to a machine. One machine may be driven by belt power, and another may be driven by gearing, etc. Electricity, as we now use it, as a power, must be classed in its greatest economy with the secondary powers, with the belt or the gearing, not with the steam engine and the water wheel. We dig from the earth coal that contains the stored energy of the sun's heat expended on forests that existed long before man came to live on this planet. We burn that coal under our boilers, and the steam generated by this application of heat to water is used to drive the piston of the steam engine, and from thence is the power conveyed by belt or gearing by shafts, or even by electricity, to the machines to be operated. We can burn zinc in costly acids, and generate electricity that can be used to drive an electric engine, and so in turn operate machines exactly as in the case of the steam engine. In this case electricity is a power exactly as steam is to be

considered as a power; and what is more, the electric battery will give us more nearly the whole of the stored energy of the metal eaten in the battery than the most improved steam engine can give us of the stored energy of the coal that is devoured in the furnaces under the boilers. With all this advantage, electric batteries are not used to drive machines with any hope of economical results.

Zinc has been gathered from the earth as an ore, it has been converted into a metal, or the metal has been gathered from the ore by means of coal and much labor; its market price is measured by the cost of its production. To burn zinc at five cents a pound in acids costing but few cents per pound, with a certainty of getting from the metal 70 or 80 per cent. of its theoretical energy in motive force, yet makes the venture more costly than burning coal under a boiler with the knowledge that we are at the best getting but little more than ten per cent. of the theoretical power that lies hidden in that coal. The electricity that is now lighting our streets, the electricity that is utilized in places to drive the street cars, has behind it the steam engine or the waterfall, the windmill, or some other motor.

By means of a steam engine we drive a dynamo-electric machine, and the electricity thence proceeding lights our streets or may be reconverted, with some loss, back into the power that created it; for one dynamo machine can be made thus to drive another, the electricity being carried from one to the other by proper conductors. What, then, is electricity as we now use it in the way of power, but as the belts and the gearing that carries our steam power to the machines? It is a belt with variable slips. But this is not forever. The future of electricity as a power is full of promise. The coal we now squander, using but a small percentage of its theoretical dynamic force, is capable of yielding its energy either as heat or as electricity; and the time will come when we will not burn this coal to boil water, and in that boiling lose say 1,000 units of its heat at the moment of the conversion of water into steam, lose all this, never to be getting it back, but we will take from the coal its energy in the form of electricity, we hope in more near ratio to its true value, and then we can convert that energy into what other form of energy we may require. The best that science can do is to point out just what energy there is in this or that source of power. The most we can hope to utilize of this energy as power will never amount to 100 per cent. Nature gives us nothing without exacting something in payment.

A pound of water is the same as a pound of metal so far as its power from gravity is concerned. In falling through space it will exert just as much force as any other pound weight is capable of doing, and no more; it will do the work due to one pound falling at any given velocity less the friction of the machine or of the moving parts. We

turn water into steam with a certain knowledge of the power that can be gained by using the elastic vapor as a spring, or we may tear the gases, which combined form water, apart, and use these gases in recombination to produce power, but less power than was taken to tear them apart, never more.

Science has made us so sure of these facts that we can base our faith on them, and with this knowledge we are willing others shall invest money in machines which are claimed to be able to develop from five drops of pure water inclosed in a ball, power enough to propel the largest steamship across the ocean. It is ignorance of the unalterable laws of physics that leads ignorant people into squandering money on so-called wonderful inventions that, out of nothing, are to give us great results. An ignorant man will spend his time pondering over perpetual motion machines, so will a man with brain gone wrong; the first will quit his folly with more learning, the second finds his home in the madhouse. A third and worse class aim to deceive, and, for a time, many a one has done so. When shrewd ignorance resorts to dishonest methods, the confiding public is apt to suffer in pocket.—*C. Sellers.*

A HAPPY MAN.

NEW YORK, Dec. 31st, 1884.

DEAR DOCTOR:—Yours of the 26th inst. having come to hand in a moment of leisure I reply to it at once. I had almost forgotten the remarks to which you refer—not having seen them in the *Cosmos* for December nor had any opportunity to revise them; they have been very fairly reported, however, and are satisfactory. It would afford me much pleasure to comply with your request, but I cannot make you any promises for fear of failure to keep them. My life is one of great and constant employment, and professional activities are to me a well-spring of pleasure. I work harder now at 64 than I did at 45, and while the labor is immense the burthen is light. In the capacities and possibilities of dental science I find the highest enjoyment. I do every thing myself and through the economies of time, strength and opertunity am enabled to do it well. I am sure of this, because I fairly revel in success, not of accumulation but of achievement. As a representative of my profession there is none prouder of his calling in the world than I am, and certainly none happier in that calling. *You* are an *earnest* man, as shown in your editorial work, and as such cannot object to my taking the part of enthusiast in my peculiar sphere. *Honest and useful labor in a dental field is the grandest employment of life* and I have not the least idea you will think of disputing it.

Truly yours, J. W. CLOWES.

Here is the secret of success for our young men: Love your business and be indefaticable in its improvement.

LIME-WATER.

MR. M. W. J.

A well known dentist of New Orleans recently had occasion to prescribe *lime-water* for a lady patient.

Having received the assurance that the mode of preparation was quite familiar, he dismissed her with explicit instructions as to its use, and directions to return in a few days.

When the patient returned, he was very much surprised to learn that no benefit had accrued to her teeth from the use of lime-water, though assured that his instructions had been faithfully carried out; that it had been used as a mouth-wash at night, and taken internally twice a day. Inquiry as to the method of taking it developed the remarkable fact that the use of milk as a vehicle had been found impracticable as the milk curdled immediately!

This led to further questioning when the dentist learned to his utter consternation that the *lime-water* used had been the JUICE OF LIMES, and almost pure!

MORAL.—Do not trust the assurance of your patients that they know how to make lime-water.

THE NEW ANÆSTHETIC—COCAINE.

EDITOR ITEMS:—I paid at the rate of $7000 a pound—$1.00 a grain for it. On December 11th, with ⅓ of a grain to 12 drops of water. I found when moisting the cavity, to be excavated, it gave instant relief from the aching pain the lady complained of and partial relief under the excavator and on drying the cavity; nearly complete relief from pain when excavating. I then use *precipitated* chalk in the same cavity and got better results still. For ten years I had used precipitated chalk in sensitive teeth and think it about as good as anything ever used to relieve sensitive dentine.

Two other cases in which cocaine has been used by me only gave partial relief. Like all anæsthetics it will prove only successful in certain cases.*—C. R. TAYLOR.

BRUNSWICK, Jan. 3rd, 1885.

EDITOR OF ITEMS:—I noticed an article in January number of ITEMS OF INTEREST in regard to the use of cocaine in dentistry. I have given it a fair trial in obtunding sensitive dentine but cannot see that it has any effect on teeth whatever. I have also used it round the gums in extracting but with not much better success. I think it is of little use except in removing cataracts or operations of that sort. In cleaning sensitive teeth I have for the last eight years used an ether spray with better success than I have had with naboli or anything else. —PARKER M. SPEAR.

*It is now for sale by Welch & Son. See advertisement.

Editorial.

LITTLE THINGS.

We all like to look at the vastness of things—at their completeness and perfection; not at their details and minutiæ. More than one will pass this article unread, because it deáls in little things. But of what is the whole composed, if not of little things—mere items, small structures, minute parts, even elements?

Of what is the gigantic rock built, if not of atoms? and yet each atom a little world of its own, whirling through space with its surface and its sky, its fertility and its diversities, its animals and its plants! And *how* is the great rock built, but by each of these little particles being drawn to each by a bond rigid, yet flexible; necessitating inertia, yet allowing motion; giving to all a durability almost eternal, yet bringing incessant modifications! What currents and motions and changes, yet apparent rest! What life, yet death! Who shall say there is no interest in little things?

How clumsy are the motions of the young child! How unskilful and purposeless its acts! In manhood they are exact, definite, and direct for the accomplishment of some precise end. Each part of his act has distinctness, precission, dexterity, and the whole a unity of parts, harmonious, rounded, complete. With the artist, the artisan and the professional man, there is no minutia unimportant, no little thing overlooked, no detail slighted. The artist will point you to his slightest touches as most important, the artisan will tell you it is only by the utmost accuracy in the smallest parts the whole is made perfect, and the professional man will assure you his whole success is his success in little things.

The dentist who makes a good gold filling is sure to give the strictest attention to the slightest details of his operation. While he has continually in his eye its wholeness and perfection, he is incessantly absorbed in minutiæ. How carefully he removes all traces of decay; with what particularity he judges the characteristics of the tooth; how precisely he shapes every part of the cavity. Then with what delicacy he handles and makes ready his gold; with what exactness of manipulation he carries it to its specific place in the cavity, and welds and condenses and forms it for its special use; one is made to enter a little drill-hole, and assume the shape, solidity, and purpose of a gold pin, head foremost; another piece is laid in a little groove, and bid tuck itself away under the least mite of a ledge; this one

is put in a corner and made to stand upright, while that one with its broad shoulders is laid flat on the floor. What can all this mean?—such tiny details in such a tiny place? One would think the man could scarce get in there himself, much less work about with hand and foot and brain with such precision! Ah, here comes a little gold blanket with which he covers the rest all over; and, as they hold out their hands to each other, their lilliput fingers clasp, and all are joined to each in a close and perpetual embrace. Why, they seem to be things of life! He imparts to them his own will! See how they shape themselves, crowd up against each other, commingle and hug one another as though they were in love! How they tuck themselves away and go cozily to sleep in each other's arms! Hark! They seem whispered to and caressed by some fairy, and sung to in sweet lullabys! Let them rest.—With wondrous grace the man behind the instruments fashions their abode, garnishing its walls and making all sides attractive to the passer by.

Had our workman been so foolish as to tumble these in promiscuously, what a quarrel there would have been! and their falling out would have been the ruin of both them and their house.

We sometimes pay dearly for mere show—are deceived by glitter; attracted, perhaps facinated, by general appearances. But what is beneath? What is the condition of every part? Is there any thing any where throughout the whole that will not endure? Let us remember, the worth of the whole is only the worth of the poorest part, so that the quality of each minutia must be considered in estimating the charter of all.

Twenty years ago we went from Minnesota to New York City, as a dentist. We had with us a recommend to a dentist there, from one in whose mouth we had done some rather extensive contour work, which at that time, was considered evidence of rare skill. After reading my note of introduction, he said: "Ah, yes; I remember seeing your work in his mouth; he pointed it out to me with pride, and I thought it very nice. I am sorry it had only recently been done, for you know we cannot judge of gold fillings—specially such extensive contour work—till they have age. The general appearance, you know, may be beautiful—these looked well—but the details of the work may be faulty and soon be the ruin of the whole." His remarks were just and confirms what we here seek to impress on our reader: that it is the character of the details, little things that make up the whole, from which the whole is to be judged. A fault any where is a fault every where; the strength of the whole is only the strength of the weakest part.

Be careful then, in the doing of every detail of your work; let there be no unguarded point; consider every trifle as the most

important till it is done perfectly; seek to hide no deformity, no imperfection, nothing as beneath care. If you have thus attended to every minutia—wrought well, and "fitly framed together" every part —you become "a workman that needeth not to be ashamed."

It is just so with character. The exterior may be all urbanity, grace, and dignity; this is the mere finish. What is the integrity of the thoughts?—the quality of the passions?—the purity of the spirit! Not on mere exceptional occasion, when the soul is stirred to its depth, and the whole heart and head are overwhelmed in the responsibility of an hour. True, then, we may disappoint by our downfall, or raise a shout of triumph by our endurance; but such occasion only shows the material of which we have been slowly made—what labor has wrought within us through long time and many means.

A great event in our lives, for weal or for woe, may be but an accident; it may make reputation but seldom makes character; it may only uncover the true character, and thus give a new reputation very different from the old. Through the sudden force of some circumstance, we may reveal what a long life of private study, discipline and labor—or what a long nursing of secret cunning, perfidy, and unholy passion—have prepared us for; a smothered fire, long pent up in our secret chamber, may be suddenly uncovered, and blaze forth to rejoice or to dismay. But all this only shows what we have been. And though we may have no control over the circumstances that bring all this to view, the little things of life which, day after day, have made us what we are, were largely of our own choosing, most of our own manufacture, and all contingent on what we make of them. We took them first perhaps as our pretty playthings for a leisure hour, then they became our choice loves to fill our passions, and finally they are our controling forces, destined to raise us into dignity and power, or pull us down to infamy and destruction.

Look; do you see the pattern running through this cloth? That figure did not come by hap. It is the result of design, and some one has worked it out. All has been made of tiny threads, interwoven with the warp and woof of the fabric. The whole piece is made of extremely small threads twisted together. Did you ever see them made? The roll of the loose cotton or wool is drawn into a delicate filament hardly strong enough to bear its own weight, and so fine you can scarcely see it coming on the spools; then three or four of these flimsy threads from as many spools are twisted into a fine cord, and run on another spool. But you know the finest thread is called six corded or eight corded. Before, therefore, our thread is complete, six, eight, or ten of these cords are drawn off as many spools and, after another twisting, run on a larger spool for use. Thus we have the thread of threads, made of 18 to 36 strands. Though still

a very little thing. These placed in the loom in a certain fashion of distances, sizes, colors and varieties, and others run through from side to side, and each thread pounded to its place by the great beam, gives us the cloth.

This is the way character is made, only still more mysteriously of little things. Simultaneously our thoughts supply the material, our imagination spins the slender filaments and these our purposes spin into stronger threads, and they are colored with the hues of passion to carry out the design of the fabric. Yes; and also at the same time, the weaving goes on; the body of the work, and the figure in it, come slowly from the great loom of life, and, ever and anon, we exhibit it to a gazing world. Each part in the process is a very little thing, yet, all united, make life what it is.

Each of us are weaving our own piece—weaving it so that it comes out of the loom for the world's use close or loose, strong or weak, wide or narrow, useful or useless. The every day's outcropings of imagination and desire, of thought and purpose, of will and passion, of words and actions, making the figure and the body of the cloth beautiful or homely, connected or disjointed, perfect or spoiled.

Let us not then despise little things—the merest thread of life. The circumstance we count as trivial, words no sooner spoken than forgotten, acts by the way, so natural to the mood of the soul as to be unnoticed by the intellect,—these, if heaven born, become the minute tapestry and the delicate coloring, without which the design has no grace. They are the exquisite touches good men admire, bright angels smile to see, and God so loves that, when he has done with the pattern here, he takes it as a treasure to place in the mansion he has prepared for the good man above.

And is it altogether of our own weaving? Have we no help? No doubt we are largely what we will to be; specially if we are positive and aggressive. But while by these qualities we make our own surroundings to a remarkable extent, are we not also the creatures of circumstances, even in the little, trivial circumstances pressing against us? Are we not often unconsciously led as frequently as we lead? The frailest influence, the merest hap, may break a thread of our past life, and bring into the loom a new one of different color, texture, and direction; tis only a slender thread lost and the new one hardly to be seen, as it is woven into the cloth. But see!—it gradually draws others after it—and still others work in till, lo, the change!

Then too, is there not a power above us—above circumstances—that has much to do in this matter? There is an Intelligence, who, if we invite, will help us wonderfully in our work. But if we refuse him we shall yet not work alone. The assistance of another will be seen, and his image will be woven in the fabric.

Allow us another figure. Our inner consciousness is a fountain. Into it, streams run from mind and heart and soul: out of it flows character—flows out whether we will or not—flows out ever, whether we wake or sleep, act or rest, speak or keep silent—flows out sweet or bitter, clear or foul, healthy or contaminating: the waters of life or the waters of death. How fortunate that we need not drink freely to know the quality of the stream. Its finest spray is grateful or repulsive, its faintest flavor is invigorating or depressing, we cannot come within its most ethereal influence without feeling its power for good or for ill.

But trace these waters of thought and passion and spiritual power to their sources; look about for the hidden springs. In the head, the little drops seem to percolate from a thousand convolutions, but the nearer thought you get the less you see; you become lost in an intangible mist. Follow to the heart the mighty flow of passion; you are bewildered as you find their source. Where is the evidence of supply? And still more mysterious and fruitless will be your search for spiritual power. The rush of the current comes tumbling into the reservoir, but in vain you look for the fountain head. With astonishment you ask: What is life? What is thought? What is passion? Whence come they, and of what are they made? Talk of little things; the littlest things of all the physical creation are big, compared to these. The eye cannot see them, the ear cannot hear them, the hands cannot handle them, yet what powers!

But what if there radiate from this fountain the miasma of death? To warn us, there are no thunderings and lightnings, no black clouds and mighty winds, not even "a still small voice." The deadly storm of miasmatic effluvia comes unheralded. Countless millions are the animalcules comprising it. So tiny are they, the strongest lens cannot reveal them. Yet wafted from the fountain of that polluted water, they enter head and heart and soul by every breath. They permeate every trace of thought, color every imagination, give character to every passion, and control every aspiration of spirit. Little things, if we measure them by the tape, but O, how mighty! Lighter than air, but O, what a weight of influence! So insignificant, as an element of science, but what an effect! Live in the pest house; move it into the midst of the deadly swamp, and still make it your home; plant there the upas tree for your shade,—but keep far away from the poisonous atmosphere of a bad character.

Would you be in a second paradise?—that restored home of a true character, where discipline has changed innocence to virtue, and serene pleasure gives place to noble deeds? Here you shall find a fountain whose sparkling waters refresh and satisfy; whose mist cools the fevered brow and bids the exhausted traveler rest; where we can admire its

shining gems and drink of its crystal waters. Bathing in its out-flowing stream, there is health and strength and inspiration.

What little things must be the particles of that fountain's spray! Of what inconceivable atoms must be the sweet scent from its pure waters! Who can measure the tiny sun ray's that lifts to the delicate spray the exhilarating aroma from the living waters! Yet, as this mixed delicacy is wafted to us on the soft zephyr, it becomes an ambrosial kiss from a genial nature. This is the influence and the blessing of a true character.

Such charms are not utopian, such characters are not as few as some think; scattered all through the land they are oases in the desert. May there be more of them. Let us each strive to be one, for all this is ours by doing each little thing well. The whole life is made of trifles, yet life is no trifle.

Mending rubber plates does not require dovetails or holes to be first made to hold the new to the old. Neither is "waxing" up, &c., of any use. Suppose we have a plate broken quite in two. Adhere the two pieces with wax on the polished surface and imbed all but the part to be mended in plaster. Now scrape away all the rubber along the course of the break, so that the sides will be quite beveled. Now make your plaster quite warm and taking a hot burnisher or knife blade press on pieces of rubber till the amount of the old taken away is restored. The first piece put on should be spread thoroughly. Place in position the other half of your flask and fill with plaster. When vulcanized, you will find your piece as strong as when it was new.

Suppose a block of teeth has been broken. File away the rubber behind the old block to a thin edge. Fit the new block to its place; then removing it spread on the old rubber with a hot knife sufficient new to fill its place, seeing that it is snugly packed around the pins, and vulcanize.

Soft and roughened enamel should be scraped and thoroughly polished. Often, the labial or buccal surface of the teeth has been so long neglected, it is like loose powder, showing the organic cement quite gone, or covered with a green, soft filament that shows the lime quite eaten out. Such surfaces may not need filling, but they sadly need cleaning and polishing. In spite of the prejudice of many patients, the whole of this loose surface must be removed, and the new, hard surface we have thus brought to view, must be polished till it shines like glass. Sometimes small pits and deep depressions will need filling, but even if there is here and there rather deep grooves and saucer-like depressions, if they are left thoroughly hard and well polished, and afterward kept clean, there will be no trouble.

WHAT IS A SENSITIVE TOOTH?

In a paper recently read before the Odontological Society of New York, as reported in the *Cosmos* of January last, Dr. John T. Codman of Boston says: "Strictly speaking, there is no such thing as an inflamed or sensitive tooth. Only after years of professional life do I realize this fact. It has taken me so long to thoroughly disassociate the idea of pain in a tooth from what is ordinarily called the tooth —that is, from the actual tooth-substance, the bone, *i.e.*, dentine and enamel—that I may say it is only just lately that I have fairly realized it. Very few of us realize, when we strike the edge of our instruments across the flinty materials that constitute the exterior tooth, causing a spasm of pain to our patients, that these substances have no pain-giving power in them; for, when the members of our profession truly realize it, they will rise to a higher plane of practice, and have clearer and unmistakable results, where now they grope in the dark."

Does Dr. Codman mean to take the position of Dr. Henry Sewill of England, that "Enamel and dentine are perfectly passive under the process of caries, and manifest neither pathological action nor vital reaction of any kind?" We hardly think he will go so far; and yet farther on he says: "I know my critical friends will say a tooth is not an inert body; but I affirm that it is." From other parts of his essay, however, he seems to view a tooth as a physiological organ. But can it be a physiological organ without life? And can it have life without bloodvessels and nerves? And can it have bloodvessels and nerves without sensation?

Does Dr. Codman mean to say the pain we seem to feel in a "sensitive tooth" under the instrument is only imaginary? We think not. He probably takes the ground Dr. Allport of Chicago occupied many years ago (but which we believe he does not take now) that the only seat of sensation in the tooth is in the pulp, and the pain we feel when a tooth is scraped is not from coming in contact with nerves, but is caused by vibrations carried to this pulp by the peculiar formation of the enamel and dentine. But if we could admit this, it would be no more than saying we could have no sensation in the skin because there were no bloodvessls and nerves in the cuticle—that the seat of sensation was really underneath. And if we tried to settle our dispute by an appeal to physiologists they would only go a step farther and assure us there was no sensation either underneath the skin nor in the tooth pulp—that the seat of sensation was in the brain.

The fact is, though these transmitting media in the tooth are not nerves and bloodvessels in the same sense and with the same forms and activities, as in softer tissues, they are yet of such a character as to carry nourishment and transmit sensation, and this is what constitutes a sensitive tooth.

EDITING.

Many of our best operators cannot be expected to be clear, concise writers. Therefore, when they send us, as editors of magazines, their thoughts, there seems to be a tacit understanding that errors of diction, redundancy and ambiguity should be corrected; and we owe this labor to our readers also. We should feel obliged to do whatever is necessary to make articles presentable, and sometimes to omit what seems irrelevant. The writings of some cannot be improved; the thoughts of others may be brought out much more clearly by slight modifications; other compositions need many changes, and considerable condensation. This is often quite a task for a busy editor, but it should not be neglected. If the writer's thought is good we should be willing to spend much time to make his language presentable, rather than throw the communication in the waste-basket, or give it to our readers in a crude form.

We cannot refrain from giving a practical illustration. The following is from one of our leading journals, and the article is written by one of our best and most intelligent operators. The thoughts are so good we prepared it for the ITEMS; but, after going over it found our changes so extensive, we feared to present it as we thought it should appear, and yet did not like to quote it verbatim. It has just occurred to us that it would probably give no offense to the publisher or to the writer if we presented it as corrected by us, and as originally printed—of course, omitting names.

Perhaps "we dentists" do not take as much pains as we should with our compositions. It is a profitable exercise to study hard to acquire a good, clear, concise style of composition. And yet, if one does his best, an inability to write well should not deter him from sending good, practical thoughts to his dental journal. Most dentists could do better if they had the time to thoroughly review what they write. The writer of the following article is a very busy man, and generally a good writer; but he has to catch time to write at odd moments, and cannot hold his production for critical review; for it sometimes takes much longer than is generally supposed to really satisfy ourselves in what we have written. On an article we wrote recently, of only three or four pages of the ITEMS, we spent four solid day's work before we satisfied ourselves, and then we were not satisfied. We wrote and re-wrote till we had wasted one hundred and fifty sheets of paper to produce what we finally sent to the printer on eighteen sheets. We are such a poor writer that we have to be very painstaking, and then we make so many mistakes we are ashamed of ourselves. If we were in an active dental practice, so much time could not be spent in this way, and if we wrote for publication we should have to rely on its being edited by another.

In the following article the words we would omit are in *italics ;* we add a few words which are in brackets. We eliminate nearly one-half, and yet we do not think any important or relevant thought is omitted.

"OPERATIVE DENTISTRY."

Dr. —— ——.

"*Under the caption of this paper I wish to treat mainly of the 'failures' which are liable to occur in the practice of operative dentistry, with the intention to incite an interesting and profitable discussion of important, undecided questions, rather than to present to you vague ideas as to their cause.*

"*It is generally admitted that* one of the most important, *if not the most important,* branch[es] of *operative* dentistry is *that which embraces the* preservation of the natural teeth by *the means of* filling ; but *in* our efforts *to preserve the dental organs of all the various persons who are apt to present themselves in a general practice, we are all sometimes baffled, misled, and* often *finally* fail, *and this is true not only of us individually, but as a profession, and we might as well stand up as men and acknowledge the fault.* The only man whom I ever believed when he told me that no filling of his ever 'came out,' lived in California, traveled on a mule, and made it a rule never to visit the same place a second time.

"*These unfavorable, but nevertheless true conditions have led us all more or less to the study of the question:* Why do fillings fail? *In my opinion, there are numerous answers to this question, most of which are true in their general way.* Perhaps, aside from pure carelessness, first, neglecting to properly protect the cervical border of a cavity (*where such border exists ;*) second, *the matter of* selecting *the* [im]proper material, *is the main cause of hundreds of failures. It is certainly a matter of regret that in the selection of filling materials so many outside considerations arise which make it exceedingly difficult to select just the material for the case in hand; so,* for instance, *how often and* how many, who are conscientiously opposed to the *general and* indiscriminate use of amalgam, are obliged to resort to its use contrary to their wishes? And is it not frequent*ly* that gold is used by some over-sanguine *but misled* dentist, who advocates gold [when plastics should be used?] *as the ne plus ultra ?* Have *there* not *in* many *instances* nasty, black, so-called silver fillings stared you in the face, where circumstances indicate that gold should be? And don't you think that many a poor mortal *was* [has been] tortured six or eight hours, with a plugger and *a* mallet, to find to his sorrow, in a *very* short time, that *human-kind does sometimes* [dentists may] err?

"It seems a peculiarity of our present infantile position as a profession, that such decidedly different opinions should exist relative to

that important question: What is the best material? I have in my mind the name of one gentleman who stands at the head of our profession, and who has frequently made publicly the statement that he has never, nor ever will, put in an amalgam filling; but I can transfer my mind and see as honest, industrious, and true a gentleman, scholar and successful a practitioner of our profession, as, perhaps, will ever grace the pages of our history, but whose true and honest opinion, so formed by actual experiments, leads him to stand entirely opposite to the foregoing theory as to the proper practice to pursue.

"*It is my conviction that* our failures in filling can be materially decreased, first, by performing all of our operations, whatever the material used, carefully and thoroughly, [so that we can say to our very soul, 'that is my best';] *by that I mean that before a filling is pronounced finished, a conscientious reply of the man to the soul should say that the 'best is done';* second, wherever a cervical border to a cavity exists, let it receive twice the care of the previous case; third, use just the material [best adapted] for the case.

"*As I stated at the beginning of this short paper, my intention was simply to incite a discussion and I therefore now leave to you the open question: What is the best material?*

We are generally rated at our true value. For a time some worthy quality may remain hidden, some rare talent be unappreciated, some coveted position for which we may be specially adapted, may thwart our grasp, but we need be in no haste. Let us give no place to discouragements, make no complaints, be willing to plod on—studying, working, improving mind and body, *doing our best*—in due time the best place our qualities merit will be ours. Character is not made in a day; a good reputation is the cumulative result of many successes. It is only in continued and persistent well doing we merit public confidence. Some great act may astonish, some skilful service may be admired, some rare gift may dazzle, but reputation worthy the whole man—one that will last, and bring substantial returns—must be a growth which only time well spent will bring us.

Difficult work should be courted, and our greatest ambition should be to master it when it comes. This is the best discipline to develop skill, and the surest road to eminence and independence. It is only by being able to do what others of our class cannot accomplish that we become conspicuous, and attract the better class of patronage. The most adroit address and the most advantageous circumstances cannot long cover superficial workmanship, while superior attainments and the performance of peculiar feats of skill will be our best advertisements.

THE FIVE SENSES.

By what processes the sensations of sight, hearing, smell, touch, and taste, are brought to our consciousness has long been taught by the wise ones, and still it is the study of teachers and scholars. We say sight comes through rays of light; sound through waves of air; smell through the scent of substances; touch through contact with substances without regard to their essential qualities: and taste through a finer touch to the tongue of a quality of substances. Do we not here observe that contact is the essential in each case? We may then reduce all these senses to one—touch—and say all are but five forms of touch. And can we not reduce all these processes of touch to a single form — motion? Then all are simply different modes of motion.

We say light is mild or intense according to the number of rays concentrated on the eye—the *force* may be so intense as to blind us; we are familiar with the fact that the variable rapidity of the waves of the air modify sounds. As we strike the chords of the piano the vibrations of the large, long, and comparatively loose wires send slow waves of air to our ear, and give us the low tones. The wires a little smaller, shorter, and tighter produce more frequent vibrations, and bring to our ear higher, sharper tones, and so we go up the scale. In touch, the soft and delicate are agreeable, and the same carried to excess are painful: it is the mode of the motion of the touch that qualifies its character. How is it with smell and taste? Philosophy has not so plainly demonstrated here; but, from what we know of the other three senses, and from what we have discovered of the two latter, the inference is that these also are merely the result of modes of motion—touch—the quality of the contact.

It used to be thought that smell was some ethereal influence; and the term ethereal was always used when we wanted to convey the idea of something we did not understand—at least something above or more sublimated than matter. But we now know that smell is the contact with the snydarian membrane of a part of the substance smelt. A very small part, it is true, and yet an actual part of it. So we have no consciousness of taste but by bringing the substance in direct contact with the papilla of the tongue. In the latter case, we say a thing is sweet, or sour, or bitter, by a quality of the substance, and yet it would be difficult to say how we determine that quality—we only recognize it by the effect of the contact. Thus with smell. Particles variable in size, shape, number and quality strike on the membrane of the nostrils; this carries the impression received to the brain, and we recognize it as a specific smell. But as this sense is so intimately interesting to our profession we will speak more fully of it in another article.

WHEN DOCTORS DISAGREE WHO SHALL DECIDE?

In an address before the N. Y. Odontological Society by Dr. E. S. Niles, of Boston, as reported in the *Cosmos* of August, we are told, page 470, that the average weight of the sublingual gland is three drams; Garretson says it is one dram. Dr. Niles says it is almond-shaped; Dr. Garretson gives it more the appearance of a cluster of grapes. Dr. Niles gives it but one excreting duct; Dr. Garretson twenty.

There are slight disparities, too, in their description of the submaxillary gland. Dr. Niles gives its average weight as one dram; Dr. Garretson as two or three. Dr. Niles speaks at first as though it had several ducts leading from the gland, but all uniting in one as it comes to the floor of the mouth; farther on, however, he says: "The ducts of the submaxillary gland vary from ten to twenty in number. They all open separately into the mouth." Dr. Garretson says: "The duct by which the gland conveys its secretion to the mouth is some two inches in length. * * * It is called Wharton's duct." Dr. Niles says, "It is often found that one or more of these [ten or twenty] ducts open into Wharton's duct; Dr. Garretson says it has only this one Wharton's duct. Dr. Niles gives the ducts of Bartholin to the submaxillary gland; Dr. Garretson to the sublingual. Dr. Niles says when the submaxillary glands are injected with mercury "they resemble a bunch of grapes; Dr. Garretson says, "The gland is somewhat of the size and shape of an almond-hull."

It is unfortunate for Dr. Niles that Dunglison, Gray and other "authorities" side with Garretson.

"*Inflammation* is due to the increased flow of blood, lymph, and nervous fluids toward the contused part."—DR. J. T. CODMAN, of Boston.

We believe this is the position taken by most of our writers. But we question it. We think the swelling, heat, and pain are all caused by obstructions in the bloodvessels, thus preventing the normal amount of blood, brought to the part, from passing through it. It is dammed up there and forced to make its way by anastomosis. Swelling, heat, and pain in a felon is from the same cause; and therefore, if we can force a normal circulalation through the part, we cure the felon. This is sometimes done, as we have said elsewhere, by winding quickly a string round the finger toward the felon, and then suddenly unwinding it. By repeating this two or three times, the felon is generally dissipated, if it has not progressed too far in putrefaction.

In inflammation, the obstruction may be a partial collapse of the blood vessels, foreign matter, or such a disintegration of the blood as to allow its fibrin to lodge in the fine epithelium on the walls of the vessels.

Miscellaneous.

MONEY MATTERS IN THE FAMILY.

Probably the subject of money in some way or other lies at the root of more family discords than any other single topic. The whole matter of earning and spending it, of giving and lending it, of using and misusing it, furnishes continual ground for disputes and hard feeling; and that family, rich or poor, who only introduces the subject for quiet consultation and mutual co-operation, is, other things being equal, an exceptionally happy and harmonious one. It too frequently occurs that in the early days of married life, the question of income and expenditure is thought too prosaic for discussion. The husband, full of generous affection, determines that his wife shall never want for anything; and she, full of loving confidence, shrinks from asking prying questions, which might hint at a lack of trust in his judgment or discretion. So the whole matter is tacitly avoided, and for a time all may go smoothly. Presently, however, changes occur. Perhaps there are reverses in business, while expenses continue and even increase, and dissatisfaction begins to be felt by both parties, though the fatal silence is still preserved. At length murmurs of discontent are heard, faintly at first, then more distinct, till at length they rise into mutual reproaches, more or less bitter, and the cup of domestic happiness is poisoned. Each party feels injured, and each *is* really injured, though in a very different way from what they imagine. In nine cases out of ten, the trouble has come about not as they think through meanness on one side or extravagance on the other, or a diminution of affection on either, but simply through a lack of common sense in entering on a mutual business without a mutual understanding. If two men were to form a business partnership, and, trusting to their mutual friendship to bring them success, should neglect to talk over their resources or consult on their several plans and methods, it would need no prophet to predict their speedy failure. No possible tie of affection between them could excuse such glaring folly. Yet this is just what hundreds of couples are doing every day, when they marry and undertake together the business of making and keeping a home without a full and mutual understanding of how it is to be done. The affection and trust that should be the corner-stone of every marriage is not sullied by discussing such matters; on the contrary, it is carelessly endangered by expecting it to fulfill tasks that belong only to that common foresight and prudence which guide us in all other affairs. The time has passed when the whole responsibility and authority of pecuniary matters were thought to be vested in the husband. The wife who fulfills her duties at home as truly earns her share of the common fund as the man who fulfills his duties abroad, and bears an equal responsibility in its use; and any lack of confidence on either side or any sense of inequality is disastrous to both.

The same thoughtfulness is requisite in considering the mutual claims of parents and children. Early childhood, as nature intended,

should be free from all care. Children are born "heirs of the earth and skies," and all that comes to them is received without question or wonder. But as they develop into maturity, they should be gradually taken into the confidence of the parents and made partners in the family interests. A large proportion of filial ingratitude proceeds simply from ignorance. Children are brought up without any knowledge of the family resources, of the claims that have to be met, or of the limits of possibility in the way of expenditure. What they *do* know very thoroughly is their own wants and desires, and when these are refused, without any adequate reason that they can see, a feeling of resentment arises, and rankles within them, and, by repetition, develops into a settled ingratitude to those very parents who are perhaps toiling hard and sacrificing themselves for their children's good.

Now, though in one sense all such ingratitude is inexcusable, much of it might be prevented by giving these young people from the start an acquaintance with and an interest in the family affairs. Of course it would have to be partial and gradual, as their increasing intelligence could take it in, and thus it would become an important branch of education. Infancy is the only time when it is natural or right to be exclusively recipient. Between this time and full maturity giving and taking should be wisely alternated till one becomes as essential to the happiness as the other. It is not kindness, but cruelty, to neglect this training in responsibility, to allow youth quietly to appropriate everything and contribute nothing. It is simply a training in selfishness which quickly bears ingratitude as one of its chief fruits. Children who are honored by their parents' confidence, and accustomed to add their quota of assistance, and to bear their share of self-sacrifice whenever the good of the family requires it, will rarely be guilty of ingratitude. They are not opposed to, but in quick sympathy with, their parents, not because they are gifted with special sympathetic natures, or in any way superior to ordinary young people, but simply because they have been made sharers with their parents in the cares and hopes, the responsibilities and labors of the family.

There is no sadder sight than a family of growing boys or girls, or grown young men and women, accepting coolly and carelessly every form of sacrifice and favor from loving, anxious parents, who are wearing out their lives in their service and reaping only ingratitude and indifference in return. Let every parent guard against such a state of things by the far more real kindness of training the children from first to last to share with them in the responsibilities, the labors, the sacrifices, the economies, as well as in the pleasures and comforts of the household. Only in this way can a family be truly united, and filial sympathy and gratitude be thoroughly developed.—*Editorial in Phila. Ledger.*

Nature of Phosphorescence.—Prof. W. Matthieu Williams says: "My note on this subject, last July, was preceded by one of the researches of Prof. Radziszewski. I learn that he has actually separated the luminous matter of the *Pelagia noctiluca*, one of the multitude of species of marine animals that appear like little lumps of jelly, and produce the phosphorescence of the sea. He evaporated to dryness 180 gatherings, and from the dry residue dissolved out, by means of

ether, a peculiar kind of fat, which, mixed with potassa, gives out, when shaken, phosphorescent flashes. This is exactly what happens to the living animal. When quiescent it is not luminous, but if shaken or rubbed it flashes. I have collected and examined a great variety of these animals at different times, the most remarkable occasion being one morning after a magnificent display of marine luminosity in the Mediterranean, a few miles off the shore of Algiers. The surface of the sea was incrusted, I might almost say, with countless millions of small jelly-like creatures, of spherical, ovoid, oblong, dumb-bell, and other shapes, varying in size from a mustard seed to a pea. A bucketful of water taken over the ship's side appeared like sago broth. They were all internally dotted with a multitude of what I suppose to be germs, that would be liberated on the death and decay of the parent. The practical importance which I attach to the study of the luminosity of these creatures is the fact that they supply light without heat. The costliness of all our present methods of artificial illumination is due to the fact that we waste a largely disproportionate amount of energy in producing heat as well as light. This wastefulness may be illustrated by supposing we obtain a pound of the phosphorescent fat of the *noctiluca*, and divide it, making one-half into candles to burn in the ordinary manner, and using the other half to give out its light by cold phosphorescence. I am not able to give precise figures, but I believe I am well within the truth in estimating the candle would dissipate 95 per cent. of the potential energy of the fat in the form of heat, giving but 5 per cent. of the amount of light the other half pound would emit as cool phosphorescence.—*Century*.

The Journey of a Million.—Statistics as carefully studied by Dr. Farr tells us that of a million children ushered into life nearly a hundred and fifty thousand pass away by the end of the first year. Twelve months later fifty-three thousand more will have followed. At the end of the third year the number living will be diminished by twenty-eight thousand more. Each year of the decade following will make its inroads on the ranks, but less serious in amount, till the thirteenth year will call for less than four thousand. Those remaining will fall out by twos and threes till the end of the forty-fifth year, when it will be found that in the intervening period about five hundred thousand have succumbed to the hardships of the way. At the end of sixty years three hundred and seventy thousand gray-haired veterans would still be keeping step with the duties of the passing days. Eighty years would see thirty-seven thousand remaining, with strength impaired and steps growing feeble. At the end of ninety-five years but two hundred and twenty-three would linger in the darkening path, and these would be rapidly thinned till in the one hundred and eighth year the last survivor of the million would disappear, and join the ranks of his predecessors in the great host of the majority.

The Nineteenth Annual Meeting of the Tennessee Dental Association will be held in Nashville, beginning Tuesday, the 24th day of February, 1885, at 10 A. M., in the Lecture Hall of the University of Tennessee.